

SPOTTED OWL MONITORING
IN
OLYMPIC NATIONAL PARK
2001 ANNUAL REPORT

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EXECUTIVE SUMMARY

Monitored spotted owl territories (“sites”) in Olympic National Park (ONP), together with those visited by U.S. Forest Service crews in Olympic National Forest (ONF), make up the Olympic Peninsula demographic study area. Over 130 northern spotted owl territories are currently included in this study. This is one of eight areas where basic demographic rates are monitored to assess the effectiveness of the Northwest Forest Plan in preventing a further decline in spotted owl populations. This report summarizes progress on the northern spotted owl monitoring project in Olympic National Park in 2001. Results from monitoring in ONF are presented elsewhere.

After two seasons with little or no reproduction, 2001 marked a return to near-average fecundity in ONP. Despite the low productivity of the last two years, occupancy rates remained high and ten new adults were banded at monitored sites.

We made 309 visits to 53 spotted owl territories to determine their occupancy and reproductive status, and made incidental visits to four additional sites. Of the 53 monitored sites, 38 were occupied by at least one adult spotted owl, and 29 by a pair. Fecundity (measured as the number of female offspring per monitored female) was 0.29 in ONP in 2001. This was the first season in ten years of monitoring to have near-average productivity; previously all years had shown either much higher fecundity or had few successful nests. This season, nine spotted owl nests fledged at total of 16 young. No nests were known to have failed. We relocated 48 previously banded spotted owls, and banded 21 new owls (10 adults and 11 juveniles) in 2001. These bring the total number of spotted owls banded in ONP to 274.

Barred owls continued to increase in numbers, with responses from 23 sites this year, 15 from single birds and eight from pairs. Three responses were from spotted owl sites where we had not previously detected barred owls.

INTRODUCTION

The Olympic Peninsula demographic study area currently includes over 130 historically occupied northern spotted owl territories (“sites”) monitored annually by Olympic National Park (ONP) and Olympic National Forest (ONF) crews. This is one of eight areas throughout the range of the northern spotted owl monitored to assess the effectiveness of the Northwest Forest Plan in preventing a further population decline.

This report summarizes results of fieldwork, cooperative efforts and administration of the owl monitoring project in Olympic National Park during the 2001 breeding season. It is intended as a summary of results for administrators and cooperators, but does not present detailed methodologies or data analysis. Methods are described in Franklin et al. (1996). Results from Olympic National Forest will be available at:
<http://www.fs.fed.us/pnw/olympia/wet/annrep.htm>

OBJECTIVES

The specific objectives of the ONP study are to:

- 1) Document age-specific survival and fecundity to contribute to range-wide assessment of trends in spotted owl populations required by the effectiveness monitoring plan for the spotted owl under the Northwest Forest Plan;
- 2) Monitor park-wide patterns in spotted and barred owl occurrence, and identify factors that could predict them. The invading barred owl has only been found in the park interior since the mid-‘90’s, and competition between these closely related species appears to be altering the distribution of spotted owls, even in a protected area as large as ONP.

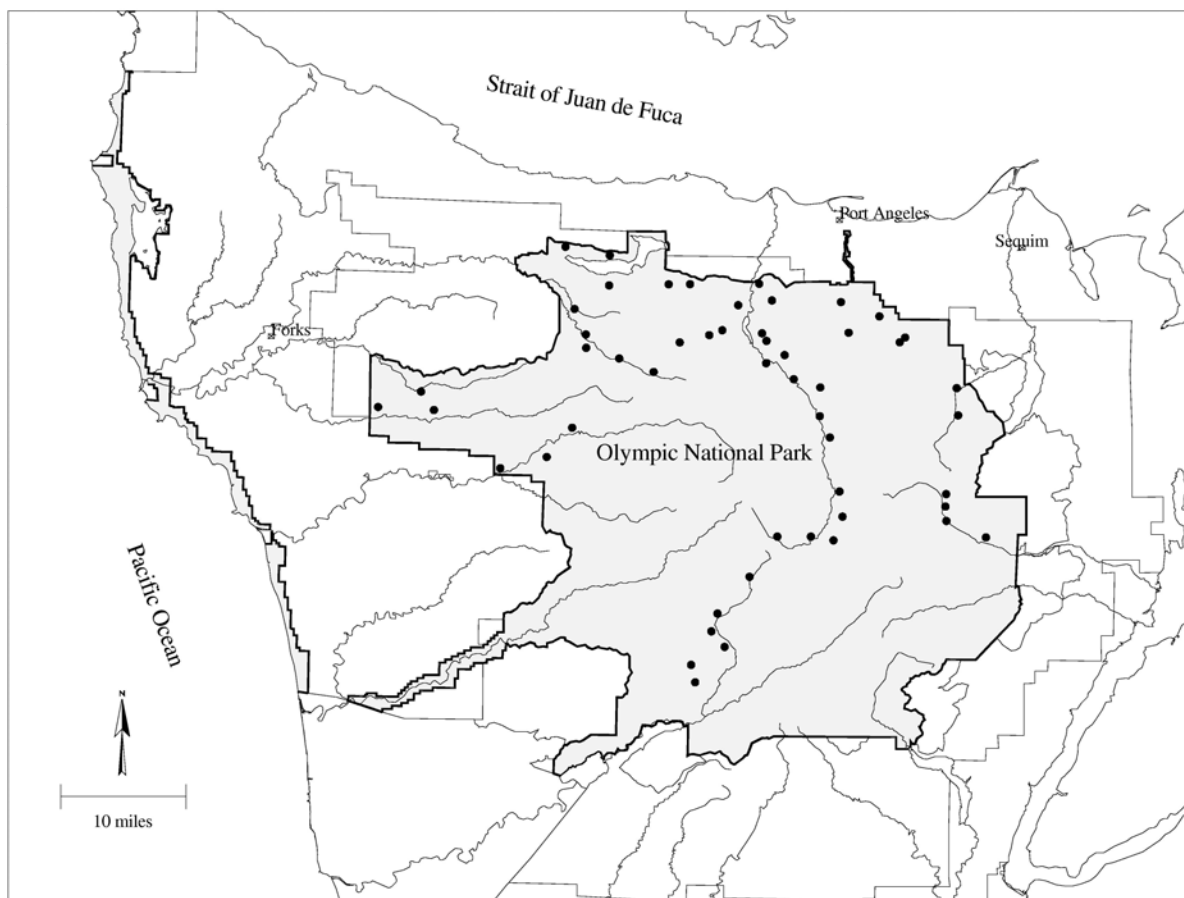


Figure 1: Sites monitored by ONP crews in 2001

2001 RESULTS

General Monitoring and Site Status

ONP monitored 53 spotted owl territories ("sites") in 2001 (Figure 1). Each of these sites has been continuously monitored since at least 1995, with records at many extending back to the late 1980's. Incidental visits were made to three sites that have not been continuously monitored and a fledgling spotted owl was reported by a Park visitor at one additional site. Funding limitations, and the difficult logistics involved in monitoring sites as far as 24 miles from a trailhead, determined the number of sites that were feasible to monitor.

There are an estimated 229 spotted owl pairs in Olympic National Park (Seaman et al. 1995), thus the 53 monitored sites, which are rarely occupied by more than 30 pairs in a given year, likely represent less than 20% of the spotted owl pairs inhabiting the Park. We have made an effort to continue monitoring sites regardless of their occupancy status, in order to avoid skewing our sample towards higher quality sites. We have also tried to keep sites well distributed throughout the park, although west side sites are not as well represented due to the lower density of owls there. In 2001, we monitored 41 sites on the park's east side and 12 on the west side.

Several spotted owl sites within ONP were monitored by other agencies. In addition to the roughly 80 sites monitored on Forest Service land, U.S. Forest Service research crews monitored 3 sites sharing Park and Forest Service land, and Washington State Department of Natural Resources (DNR) crews visited 2 sites in the Park coastal strip.

April snowpack in the eastern Olympic Mountains was roughly 50% of average (USDA NRCS data). Most trails at the elevations of our spotted owl sites were melted out by the end of March, and we were able to reach many sites close to a month ahead of normal. The full field crew (4-5 two-person teams) made visits to owl sites between March 12 and June 26, and one to two teams worked through August 11.

The total monitoring effort for 2001 was approximately 280 team-days in the field. ONP field crews made 312 visits to a total of 56 spotted owl sites. For the 53 monitored sites, crews made a total of 309 visits (mean visits/site(sd)=5.8(2.7), and detected at least one spotted owl on 157 of these visits. Of all spotted owl sites visited by ONP crews in 2001, 53% were occupied by pairs (Figure 2).

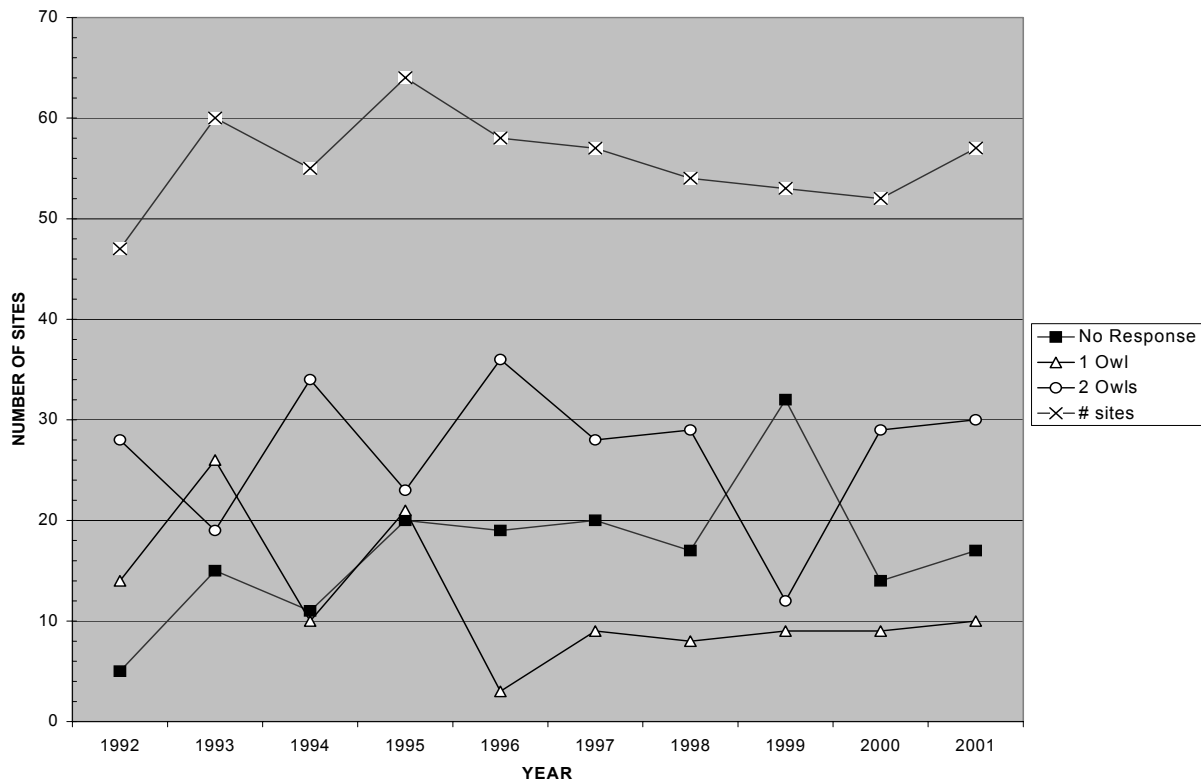


Figure 2. Number of spotted owl sites with at least one visit recorded, and number of sites occupied by 0, 1, or 2 adult spotted owls.

Reproductive Monitoring

Spotted owl reproductive success (fecundity) is defined here as the number of female young produced per territorial female, assuming a 50:50 sex ratio among offspring. The fecundity estimate for the 2001 breeding season was 0.29 (n=28). We determined the reproductive status of all but one of the females found at our monitored sites this year. Average park-wide fecundity for 1992-2000 was 0.35 (s.e. 0.03) when computed for a sample of all known status females, adult and subadult (fig. 3). The long-term average fecundity estimate for adult females over the range of the northern spotted owl is 0.32 (s.e. 0.03) (Franklin, et. al, 1999).

The mean fecundity of west-side spotted owl sites has been consistently higher than those on the east, 0.42 vs 0.33 respectively, but the difference over all years of monitoring is not significant (ANOVA, $F_{1,216}=1.702$, $P=.193$). However for 2001, the west-side mean of 0.55 (N=9) was significantly higher than the east-side mean of 0.16 (n=19) (ANOVA, $F_{1,26}=5.910$, $P=.022$)

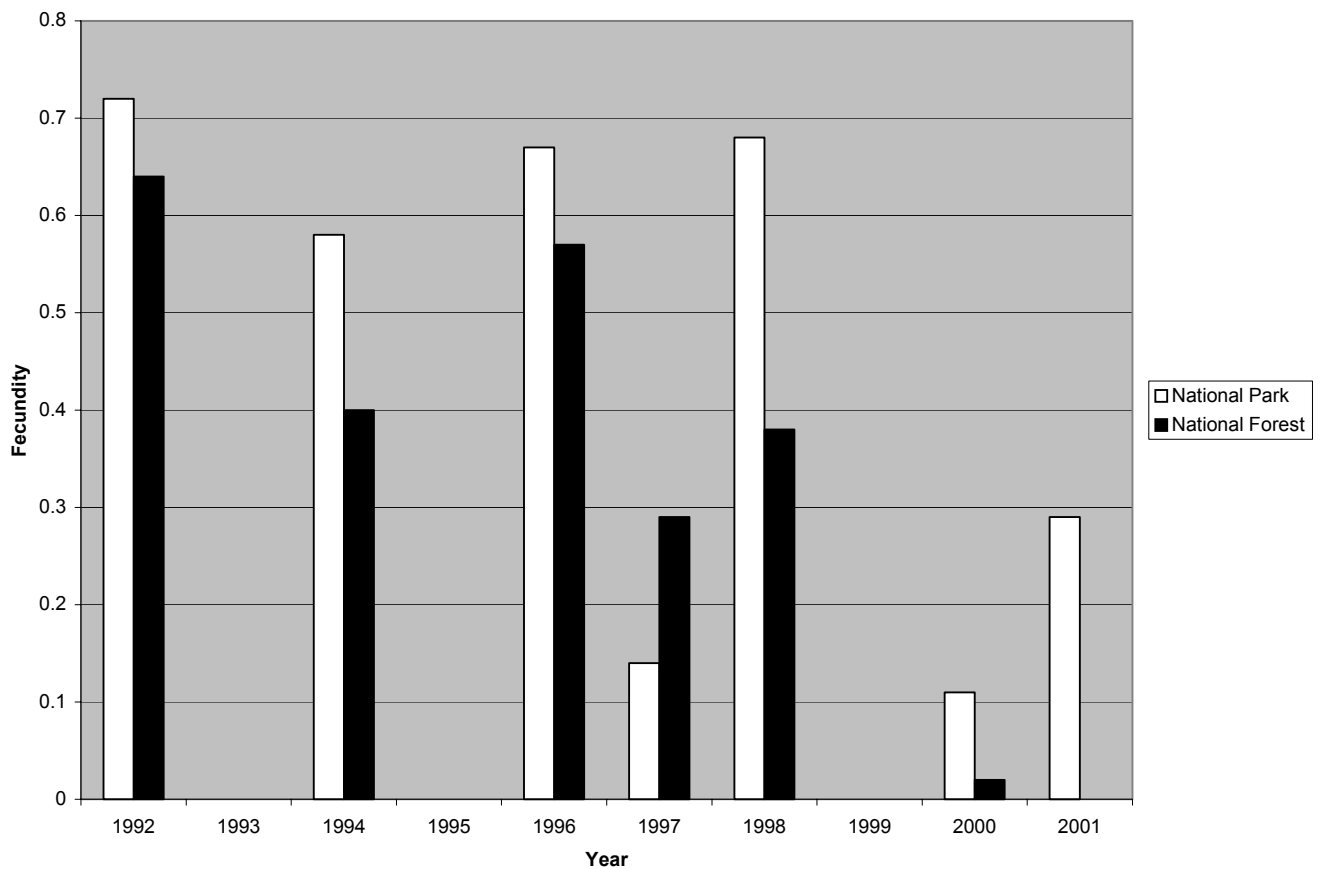


Figure 3. Average fecundity for territorial female spotted owls monitored on the Olympic Peninsula, 1992-2001. No data for National Forest in 2001.

There were 9 confirmed nesting attempts and all of these were successful, fledging a total of 16 juveniles. All nests were in tree cavities. No juvenile mortality was documented at any of these sites, and at seven sites we relocated juveniles four or more weeks following fledging.

Another way to look at productivity is to measure the output of young by monitored site, rather than by monitored individual. This combines the effects of occupancy and fecundity at the territory level to give a more complete measure of site productivity. A wide range in site productivity is apparent in figure 4, with much of the productivity concentrated in a few sites.

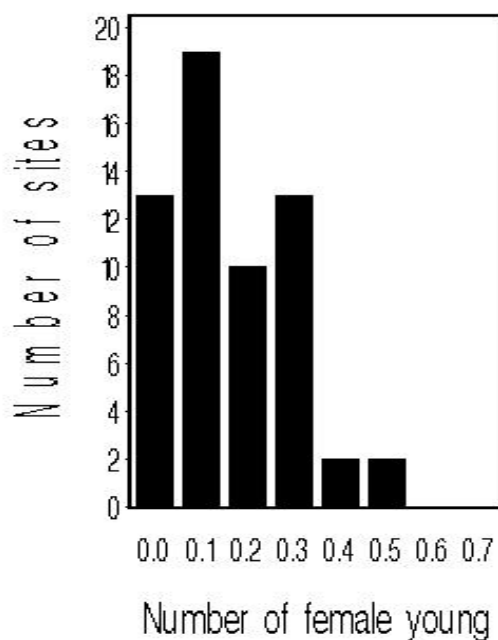


Figure 4: Annual output of female young at sites monitored for >2 years in Olympic National Park : 1992-2001.

Banding

Banding owls is necessary to estimate survival rates. All captured owls are fitted with a U.S. Fish and Wildlife Service number band and a color band unique to a ten mile radius around each site. This enables field crews to identify individuals without recapturing them. We use standard capture techniques for spotted owls (Franklin et al. 1996), and emphasize owl safety during training. There have been no owl injuries in 387 successful captures (using both hand capture and noosing techniques) of 274 different owls at ONP. In 2001, we resighted 48 adult owls banded in previous years and banded 10 new adults. We banded 11 of

the 16 juveniles fledged from monitored sites. 83% of the owls occupying our monitored sites were identified by capture or re-sighting of color bands.

Two birds banded in the Park as juveniles in past years were relocated this year; one by Park crews and one by Olympic National Forest crews. Of 86 juveniles banded by ONP crews in the Park prior to 2001, 8 have now been recaptured as adults or subadults on the Olympic Peninsula.

Capture and banding was conducted under ONP master station banding permit # 22633, U.S. Fish and Wildlife Service 10(a)(1)(a) “take” permit TE842449-1, and Washington Dept. of Fish and Wildlife Scientific Collection Permit # 01-102.

Elevation Range

The inventory project (1992-1995) provided a relatively unbiased estimate of the elevation distribution of spotted owls at ONP. Landscape elevations, as well as suitable forest cover, tend to be higher on the east side of the park. Successful west side nests (n= 14) averaged 1468’ (range 400-2400’), while east side nests (n=22) averaged 2384’ (range 1120-3520’)(Seaman et al. 1996). Subsequent monitoring at ONP has not resulted in the discovery of any successful spotted owl nests above 2400’ on the west side; a nest in the upper Sol Duc Valley in 2001 is the highest to date on the Park’s east side at 3750’. Comparison of owl nest elevations with the amount of suitable habitat available in each band of elevation showed that owls used lower elevation forests far more often for nesting than availability would predict (Seaman, 1998).

Although our monitored sites were not randomly selected, they should show trends in spotted owl elevation distribution. The average elevation of occupied (two owls or a single owl with multiple detections) east side sites has shown a significant increase ($F_{1,212}=18.1$, $P<.001$) since 1992 (Figure 5). This represents both an increase in unoccupied low elevation sites and, to a lesser extent, the movement of occupied sites to higher slope positions. No trend is apparent in the smaller sample of west side sites. In 2001, occupied east side sites averaged 2774’ (n=26), while occupied west side sites averaged 1359’ (n=9). This season only 4 of 41 monitored east-side sites had site centers below 2200’, which was the mean

elevation of all east-side sites as recently as 1994. It is likely that expanding barred owl populations (see next section) are displacing spotted owls from lower elevation sites on the east side of the park.

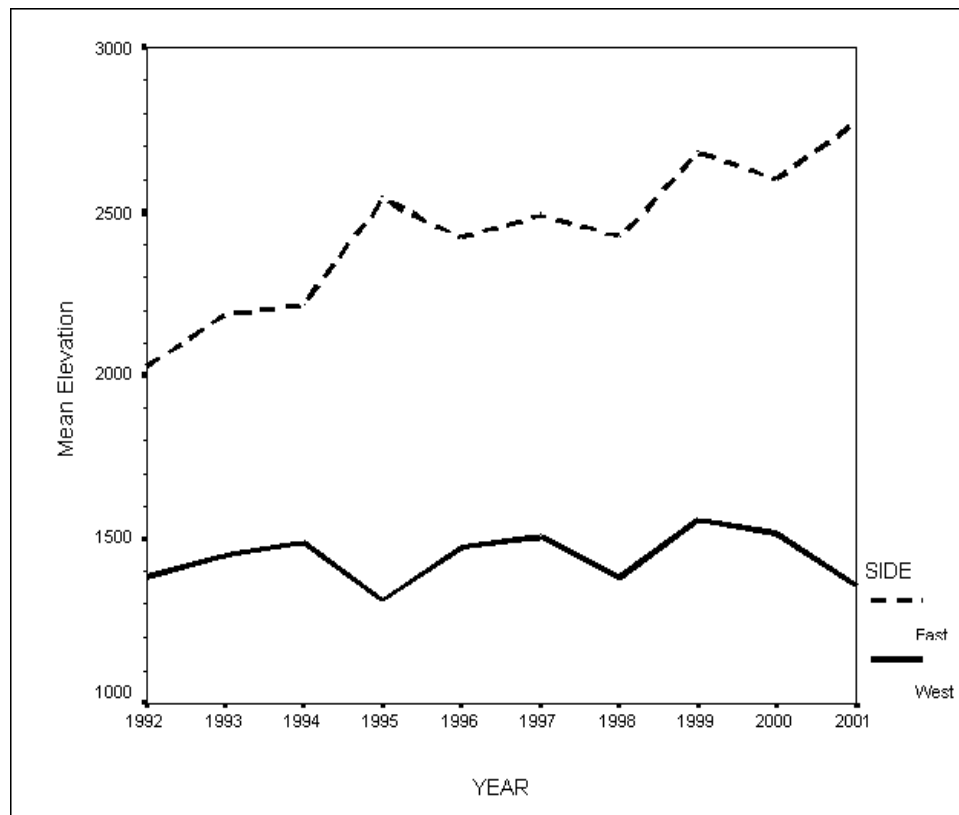


Figure 5: Average elevation of monitored spotted owl sites occupied by two owls or resident single on east and west side of Olympic National Park

Barred Owls

Barred owls (*Strix varia*) have recently expanded their geographic range into the Pacific Northwest. The first documented occurrence on the Olympic Peninsula was on the west side of ONP in 1985 (Sharpe, 1989), and the number of sightings has continued to increase (Fig. 6). The number of spotted owl sites monitored is provided in this figure as a general index of monitoring effort, although during the years of the survey project (1992-1995) there were roughly twice the teams in the field as during the years 1996-2001. Barred owls are dominant in competitive interactions with spotted owls and most evidence suggests that

barred owls can displace spotted owls (Dark et al. 1998; Hamer 1988). Until the mid-90's barred owls had only been found fairly close to the park boundary; more recently they have occupied sites deep in the park. This shift has been particularly noticeable on the east side of the Park, where barred owls were not documented until 1990.

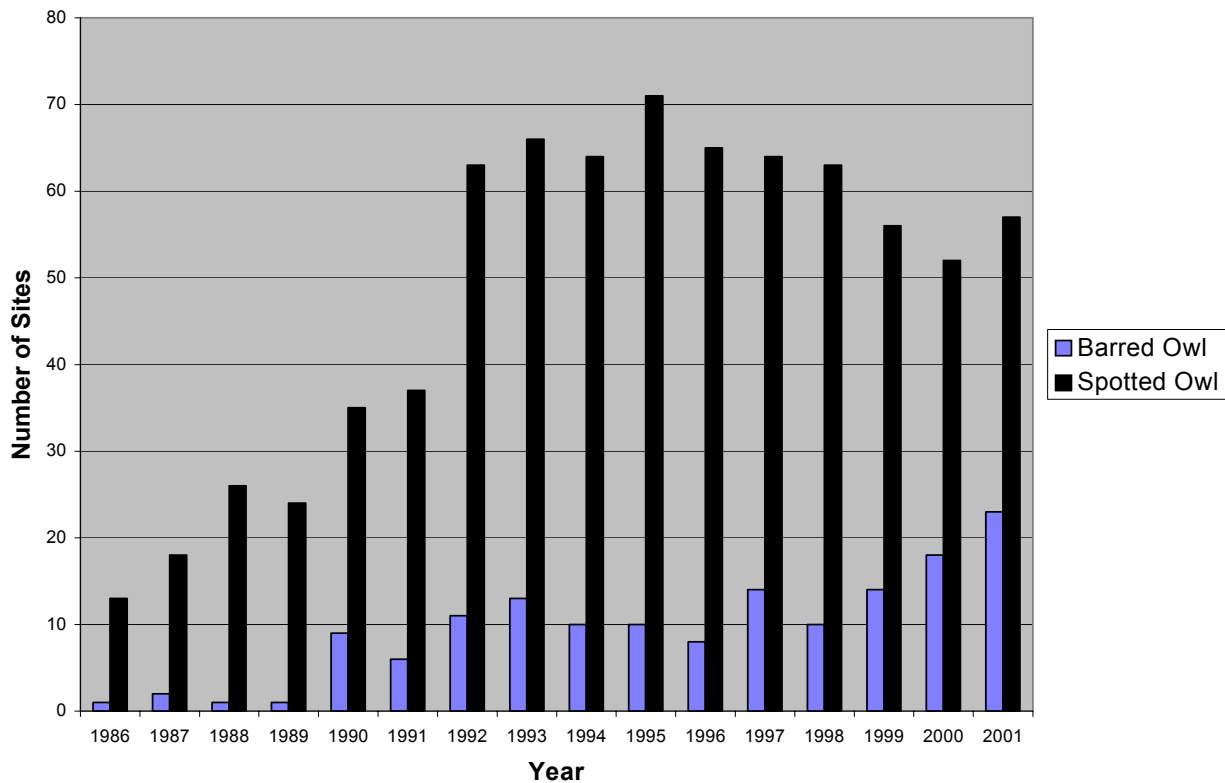


Figure 6: Number of barred owl sites found in the course of spotted owl monitoring activities at ONP: 1986-2001.

Barred owls have now been found in most forest types available to them in ONP. All documented nesting by barred owls has been in areas adjacent human-maintained openings or in low elevation floodplain forests with a component of deciduous trees. As a result, the spotted owl sites most affected by barred expansion have been those positioned on lower slopes and river terraces. However single barred owls and non-nesting pairs have occupied spotted owl sites in conifer-dominated stands far from any human or riparian-created openings. Quantifying the extent of the effects of barred owls on spotted owls is difficult and

will be a primary goal of additional analysis of our monitoring data. Of the 15 spotted owl sites with no response in 2001, 14 have had barred owls responding near old site centers in this or previous years. Conversely, of the nine spotted owl sites nesting, 5 have never recorded nearby barred owl responses, three had moved over 750m following barred occupancy of an old site, and one had a single barred owl response at the active nest tree during incubation.

We recorded barred owls at 23 sites in 2001. Fifteen of these were of single barred owls on one or more occasion, and 8 were detections of pairs. We found four new barred owl sites, and three of these were in historic spotted owl territories. At Barnes Creek Lower, a spotted owl site near Lake Crescent with no previous barred owl responses and an unbroken record of spotted owl occupancy back to 1990, crews found barred owls on two visits and failed to find spotted owls on six visits. In the North Fork Quinault, a barred owl was found on March 30 at a historic spotted owl nest tree 8 miles upriver from the closest previously known barred owl site. On April 28, the historic male spotted owl was found at the same site, where the pair later fledged two young.

We confirmed barred owl reproduction at only two sites this year, both in the coastal strip. Two juveniles were found fledged on May 18 at the north end of Lake Ozette, and two were found near Mora at the mouth of the Quilayute River.

Hybridization between barred and spotted owls has been documented, but appears to be infrequent after the initial period of colonization (Hamer et al. 1994; Herter and Hicks, 2000). No hybrids were found at ONP in 2001. The DNR located the known hybrid female near the park coastal strip and found her paired and not-nesting with a male barred owl.

Other Species

In addition to barred and spotted owls, we also record incidental responses by goshawks (*Accipiter gentilis*) and great-horned owls (*Bubo virginianus*). We recorded no responses by either species this year. The number of occupied goshawk sites encountered during owl monitoring has declined from 4-6 per year 1994-1997 to 0-2 per year 1998-2001. Great-horned owls are rare in the dense, mid-elevation conifer forests of ONP where most of

our monitoring takes place, with most past records coming from subalpine areas, or near the Park boundary.

COOPERATIVE EFFORTS

Monitoring data from ONP were combined with that from the surrounding National Forest study for a range-wide demographic analysis of northern spotted owl populations. This court-mandated data analysis took place in Corvallis, OR in December 1998 and estimated a 3.9% annual decline in the population of territorial females for the 16 study areas included (Franklin et al. 1999). Survival rates of adult females and the mean number of young produced per female showed no linear time trends. For the Olympic Peninsula study area (combined ONP and USFS sites), the analysis estimated an annual decline in adult female northern spotted owls of 5.9%. With a 95% confidence interval, the decline could range from 2.1% to 9.8% a year.

We continue to send all owl location data to the Washington Department of Fish and Wildlife (WDFW) for its state-wide spotted owl database.

BUDGET

Funding was provided at the level of \$113,327 in FY 2001. Of this amount, \$25,000 was from the Regional Ecosystem Office (NPS), \$63,327 from a grant through the Park Service Natural Resource Preservation Program (NRPP) and \$25,000 from Olympic National Park base funds dedicated to threatened and endangered species monitoring.

PUBLICATIONS

The following paper was co-authored by ONP researchers Susan Roberts and D. Erran Seaman, and partially funded by the U.S.D.I. National Park Service:

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. *J. Raptor Res.* 35(2):141-150.

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